Docket No: Inventor(s):

MS1-1647us

Kesal et al.

lee@hayes

1 of 11

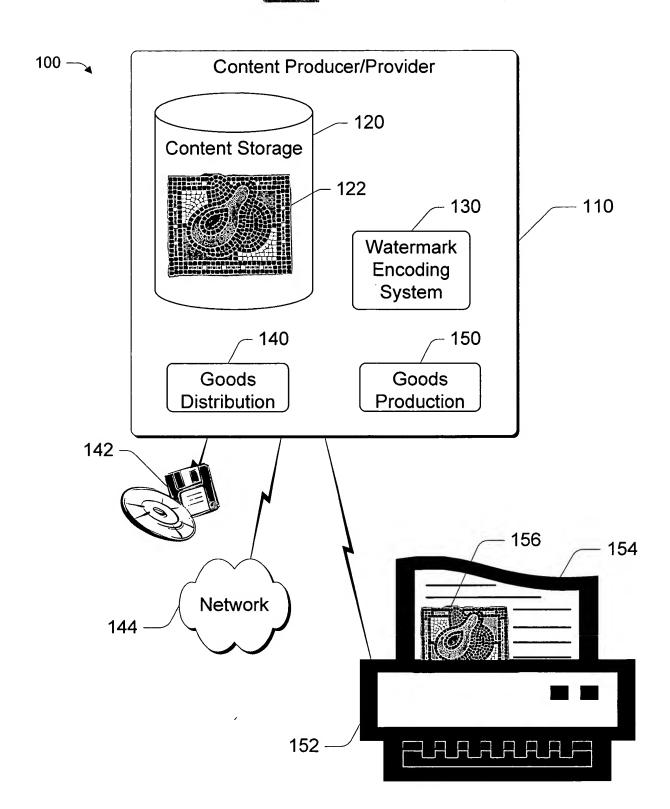


Fig. 1

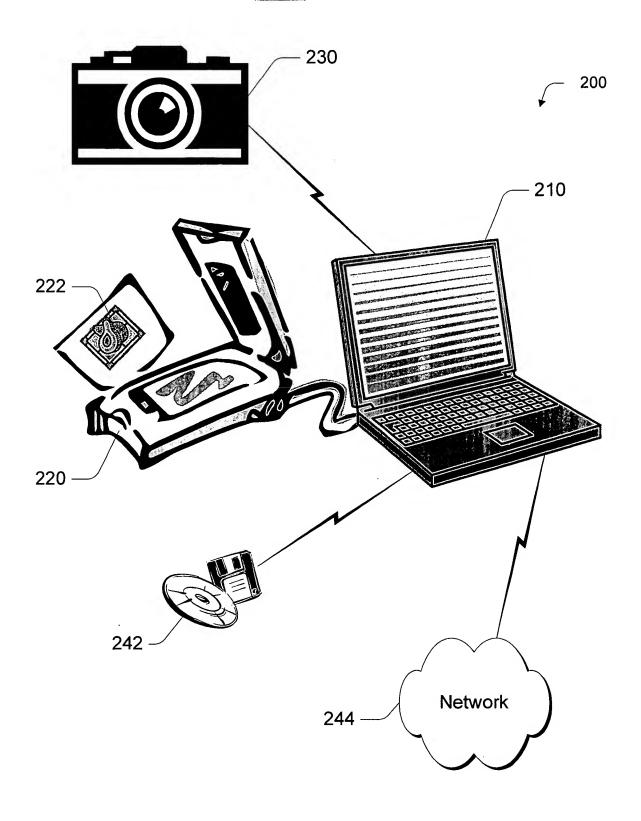
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Docket No: Inventor(s):

MS1-1647us Kesal et al.

2 of 11

lee@hayes



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Docket No:

MS1-1647us

3 of 11

Inventor(s): Kesal et al.

lee@hayes

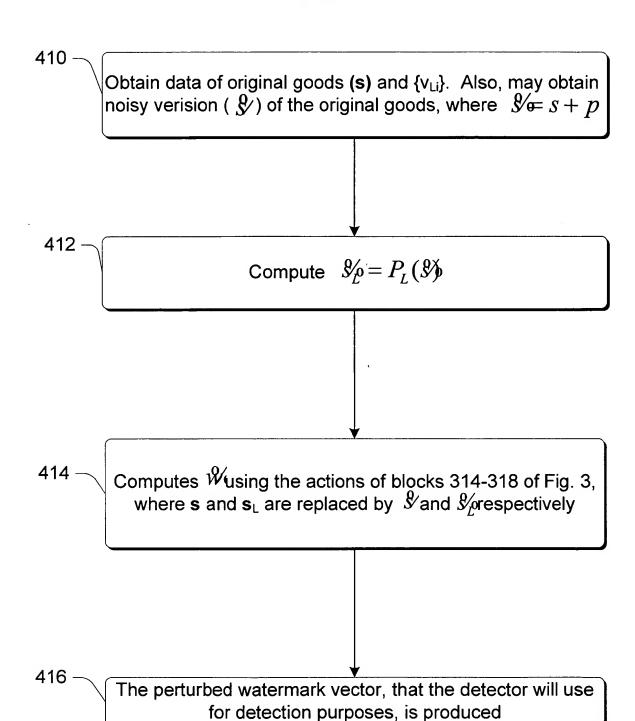
310 -Obtain data of original goods (s) and {v_{Li}}. 312 -Compute $s_L = P_L(s)$ 314 Pseudo-randomly generate a 316 sets $\mathbf{w}_{prev} = \mathbf{a}$, $error = 10^{10}$, and $\epsilon = 10^{-3}$ 318 Repeat iteriative processes while error > ϵ 320 -Produce watermarking vector (w) and the watermarked signal (s+w)

Docket No: Inventor(s):

MS1-1647us Kesal et al.

4 of 11

lee@hayes



Docket No:

MS1-1647us Kesal et al.

5 of 11

Inventor(s):

lee@hayes

Obtain pre-defined humanly perceptible authentication pattern (M), original host signal (s), and watermark (w). Also, may obtain noisy verision (\mathscr{Y}) of the original goods, where $\sqrt[g]{} = s + p$

Construct authentication-transformation matrix (T) for M, s, and w in accordance with

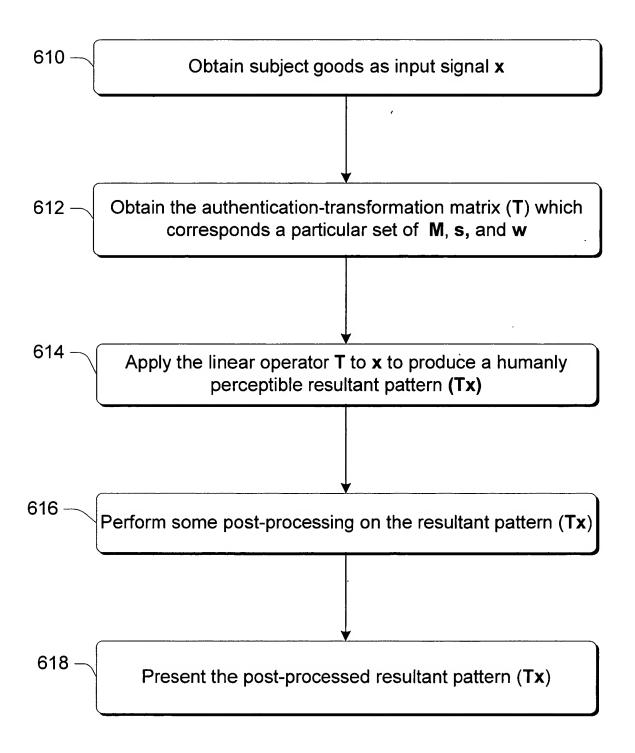
$$t^{j} = c^{j} - \frac{\langle c^{j}, \$ \rangle_{\bullet}}{\left\| s \right\|^{2}} \$ \rangle_{\bullet} - \frac{\langle c^{j}, \$ \rangle_{\bullet}}{\left\| w \right\|^{2}} \$ \rangle_{\bullet} + M_{j} \frac{\$ \rangle_{\bullet}}{\left\| w \right\|^{2}}$$

Store and/or transmit the just-constructed authenticationtransformation matrix (T)

Docket No: MS1-1647us Inventor(s): Kesal et al.

6 of 11

lee@hayes



lee@hayes

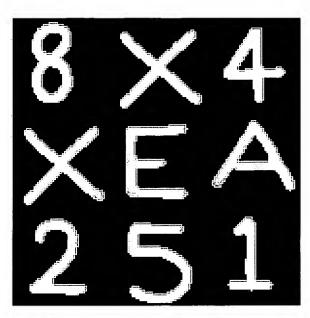


Fig. 7A

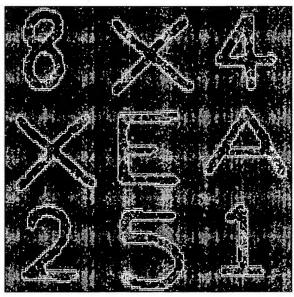


Fig. 7B

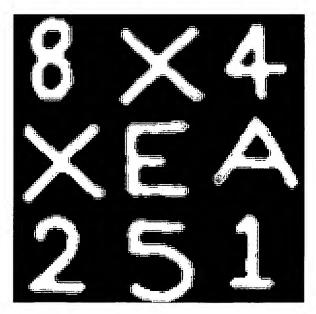


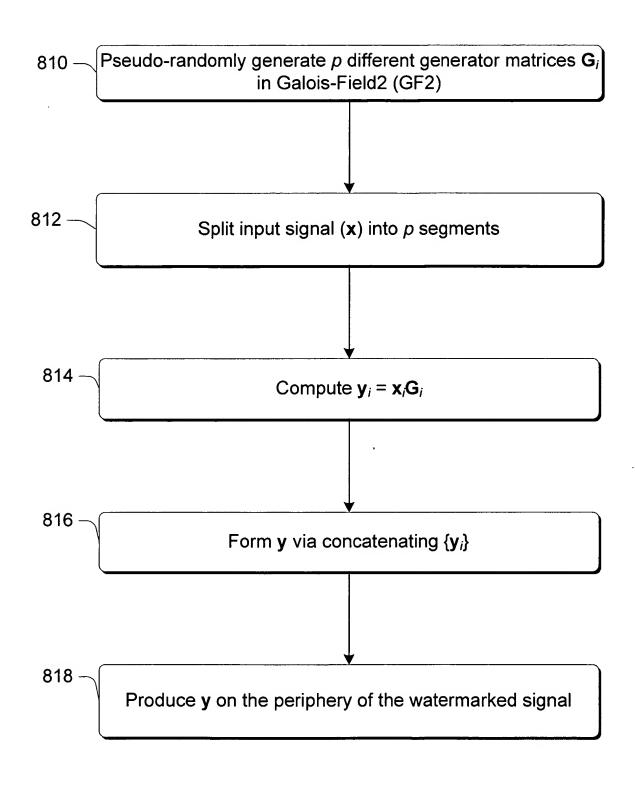
Fig. 7C

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Docket No: MS1-1647us Inventor(s): Kesal et al.

lee@hayes

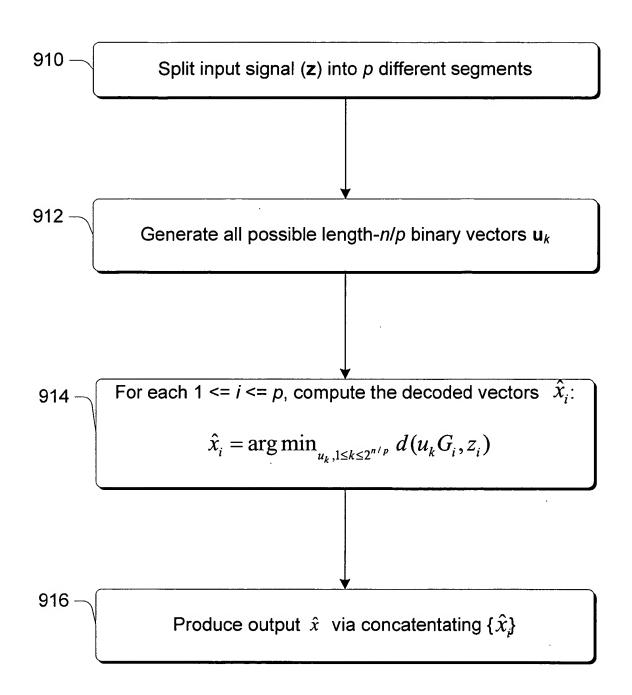
8 of 11



Docket No: MS1-1647us 9 of 11

lee@hayes

Inventor(s): Kesal et al.



MS1-1647us

Kesal et al.

10 of 11



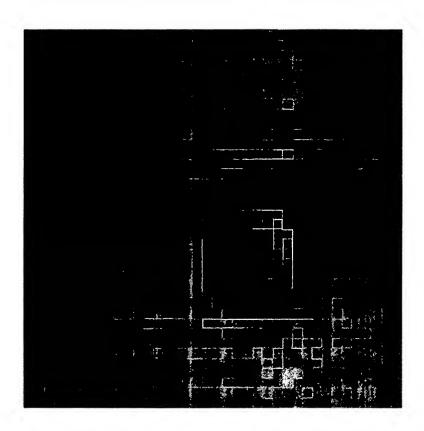


Fig. 10A

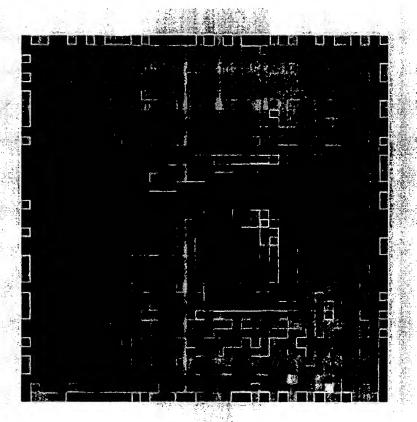


Fig. 10B

Docket No: MS1-1647us 11 of 11 Inventor(s): Kesal et al.

